International Journal of Medicine and Pharmaceutical Science (IJMPS)
ISSN (P): 2250-0049; ISSN (E): 2321-0095
Vol. 8, Issue 1, Feb 2018, 53-58

DETERMINANTS OF EPILEPSY IN CHILDREN AND ADOLESCENTS (6-19YEARS) IN A TERTIARY CARE HOSPITAL IN KANPUR

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ABSTRACT

Background

Epilepsy is the commonest neurological public health problem in children and adolescents. Very few studies have been conducted on the determinants of epilepsy in India.

Objective

This study was carried out to study the determinants of epilepsy children and adolescents (6–19 years) attending OPD in the Department of Pediatrics, GSVM Medical College, Kanpur.

Methods

This was a cross-sectional study conducted in the outpatient of the department of Pediatrics, GSVM Medical College, and Kanpur. All children 6 to 19 years of age, attending the OPD from October 2016 to March 2017 meeting the inclusion criteria were included in the study. A pre-tested questionnaire was used to record history, clinical examination, and investigations. Data was analyzed using SPSS version 22.0. Chi-Square test and descriptive statistics were applied.

Results

Of the 1232 subjects screened, 59(4.7%) were found to be suffering from epilepsy. Around 59.3% of those with epilepsy were males, which was significantly higher than 48.8% males among those without epilepsy. Among those with epilepsy, 62.7% had a positive family history of epilepsy which was significantly higher than among those without epilepsy (34.4%). Among those with epilepsy, 57.6% study subjects were born out of consanguinous marriages which was higher than among those without epilepsy(37.3%) and this difference was statistically significant. Multiple logistic regression analysis revealed that age, gender, consanguinity and family history of epilepsy were significantly associated with epilepsy.

Conclusion

Epilepsy among children and adolescents (6–19 years) wasmore common in males as compared to females. Consanguinity and positive family history of epilepsy wereassociated risk factors.

KEYWORDS: Prevalence, Epilepsy, Determinants & Family History

Received: Nov 21, 2017**; Accepted:** Dec 11, 2017**; Published:** Jan 06, 2018**; Paper Id.:** IJMPSFEB20188

Original Article

INTRODUCTION

Epilepsy is the most common chronic neurological disease of the pediatric age group, characterized by recurrent, unprovoked, paroxysmal seizure activity.[1]It is now recognized as a global public health problem Causes can range from brain injury, brain tumor, infections of the brain, stroke, and birth defects, which occur through a process called epileptogenesis. Genetic as well as environmental causes such as brain trauma, tumors, stroke, and complications of previous infection cause epilepsy, with one or more factors being the cause. Exact cause is not known in almost 60% cases.[2]

The mechanism is not clearly known. There is a decrease in resistance firing of excitatory neurons due to changes in ion channels or when inhibitory neurons fail to perform properly. This leads to development of seizures from a particular area of the brain, called as "seizure focus".[2-5]Recent studies have revealed clinically relevant mechanisms of generalized and localized seizures, among which are inherited abnormalities of ion channels, hippocampal sclerosis, cortical malformations, and dysfunction of glial cells.[1]

More research is required on the prevalence of epilepsy and its determinants, to better understand epilepsy and to determine measures for the prevention of its occurrence. Globally, epilepsy is one of the world's most common non-communicable disease affecting approximately 50 million people.[6,7]Of these, 40 million are residing in developing countries. In developing nations, epilepsy is more common in older children and young adults, due to differences in the causes of epilepsy in these regions.

There are no recent studies on the risk factors of epilepsy in children and adolescents in. Therefore this study was done to study the determinants of epilepsy children and adolescents (6–19 years) attending GSVM Medical College , Kanpur.

MATERIAL AND METHODS

Setting and Design

This was a cross-sectional study carried out in the outpatient of the department of Pediatrics, GSVM Medical College, and Kanpur. All children 6 to 19 years of age, attending the OPD from October 2016 to March 2017 meeting the inclusion criteria were included in the study. Ethical clearance was taken from the Institutional Ethical Committee, GSVM Medical College, and Kanpur

Inclusion Criteria

Children between 6 to 19 years of age

Children meeting any of the following conditions (Revised ILEA definition of epilepsy)[8]:

- At least two unprovoked (or reflex) seizures occurring greater than 24 hours apart.
- One unprovoked (or reflex) seizure and a probability of further seizures similar to the general recurrence risk (at least 60%) after two unprovoked seizures, occurring over the next 10 years. Parents giving written informed consent

Exclusion Criteria

Parents not giving consent

METHODOLOGY

Written informed consent was taken from the parents of children included in the study. Parents were interviewed using a pre-tested questionnaire. The first part of the questionnaire consisted of screening questions to confirm that the child's symptoms met the inclusion criteria. All children classified as suffering from epilepsy based on history were sent for further assessment including clinical examination, EEG and other investigations and the diagnosis was confirmed. Thereafter other details of the study subject like family history (among first degree relatives), age, education and occupation of the parents were recorded.

Statistical Analysis

Data was compiled and analysed using SPSS 22.0. Categorical variables were analysed using percentages and chi square test. Multiple logistic regression analysis was done to find outdeterminant of epilepsy. P value less than 0.05 was taken as significant.

RESULTS

A total of 1232 children and adolescents aged 6 to 19 years were studied. the mean age of the study subjects was 10.6 ± 2.3 years. Of the 1232 subjects screened, 59(4.7%) were found to be suffering from epilepsy.

Table1 shows the biosocial characteristics of study subjects. Of the study subjects with epilepsy, 57.6% were in the age group 6-10 years as compared to 40.4% in the age group 6 to 10 years among those without epilepsy and this difference was statistically significant. Around 59.3% of those with epilepsy were males which was significantly higher than 48.8% males among those without epilepsy. Religion, age of the father at childbirth were not significantly associated with epilepsy. Similarly there was no significant association between epilepsy and education of the mother and father and history of febrile seizures. Age of the mother at childbirth was also significantly associated with epilepsy. Children with epilepsy were born to older mothers. Among those with epilepsy, 62.7% had a positive family history which was significantly higher than among those without epilepsy (34.4%). Among those with epilepsy, 57.6% study subjects were born out of consanguineous marriages which was higher than among those without epilepsy(37.3%) and this difference was statistically significant.

Table 2 shows that multiple logistic regression analysis was done used to find out determinants of epilepsy. It was found that age, gender, consanguinity and family history of epilepsy were significantly associated with epilepsy in the study subjects. For study subjects aged 10 to 19 years, the risk of recurrence decreased by 0.36 times as compared to study subjects with age 10-19 years. Female study subjects were 0.41 times less likely to develop epilepsy as compared to males. Study subjects with a family history of epilepsy were at 3.74 times and those with history of consanguinity were at 1.15 time’s higher risk of developing epilepsy as compared to those without respective history. Age of the mother at childbirth was not associated with recurrence of seizures.

DISCUSSIONS

In the present study, the hospital-based prevalence of epilepsy was 4.9%. The community based prevalence was 9.8 per 1000 population in Pakistanand 4.8 per 1000 population among the Parsi community in India.[9,10]A study from Turkey revealed that among 1,625 primary-school students aged 6 to14 years, twenty-two children were diagnosed as epileptic. In males, the prevalence of epilepsy was 4.9/1000, and in females, it was 12.4/1000, representing a total of 8.6/1000. Cumulative prevalence in males was 11.0/1000, and 16.1/1000 in females, making a total of 13.5/1000. This difference was due the fact that hospital based prevalence is always higher than that estimated from the community.[11]

In our study, among the study subjects with epilepsy, 57.6% were in the age group 6-10 years as compared to 40.4% in the age group 6 to 10 years among those without epilepsy and this difference was statistically significant. Another study found that the median age of onset of seizures was 8 years.[12]Another study found that the mean age of subjects diagnosed with epilepsy was 11.94±2.99 years.[13]

In the present study, around 59.3% of those with epilepsy were males which were significantly higher than 48.8% males among those without epilepsy. Among those with epilepsy, 62.7% had a positive family history, which was significantly higher than among those without epilepsy (34.4%). Among those with epilepsy, 57.6% study subjects were born out of consanguinous marriages which was higher than among those without epilepsy(37.3%) and this difference was statistically significant. Other studies have shown a 1.4-fold higher prevalence of epilepsy in males compared to females.[10] Regarding risk factors for epilepsy, other studies have revealed that about (68.2%) had relatives of the same family with history of epilepsy, and there was a significant association between family history and epilepsy ($p<0.001$).[14]Prischich et al also observed that there was a significant association between family history and epilepsy.[15] Another study also showed a positive family history in 40% of epilepsy cases.[14]

In the present study, age, gender, consanguinity and family history of epilepsy were found to be significantly associated with epilepsy in the study subjects, whereas there was no significant association between epilepsy and education of the mother and father and history of febrile seizures. In another study, however, risk of epilepsy was 15.1 times higher in those with history of febrile convulsion.[14]

CONCLUSIONS

In conclusion, the hospital-based prevalence among children and adolescents (6–19 years) was 4.9%, higher in males than in females. It was significantly associated with consanguinity and positive family history. Policies and programs must be developed to control the risk factors of the problem. Strengthening of the health system to provide education about the determinants of epilepsy in the community could reduce the prevalence of epilepsy in India.

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Table 1: Factors Associated with Epilepsyin Study Subjects

Determinant		Study Subjects Without Epilepsy (n=1173)		Study Subjects With Epilepsy (n=59)		Total	P Value
		No.	%	No.	%		
Age(years)	6–10	474	40.4	34	57.6	733	<0.05*
	10–19	699	59.6	25	42.4	499	
Gender	Male	572	48.8	35	59.3	607	<0.05*
	Female	601	51.2	24	40.7	625	
Religion	Hindu	604	51.5	32	54.2	636	>0.05
	Others	569	48.5	27	45.8	596	
Age of mother at childbirth	20–39	400	34.1	17	28.8	355	<0.05*
	40–59	438	37.3	22	37.3	460	
	60 and above	335	28.6	20	33.9	417	
Education of mother	Illiterate	527	44.9	26	44.1	553	>0.05
	Literate	646	55.1	37	62.7	683	
Mother's occupation	Working	526	44.8	28	47.5	554	>0.05
	Not working	647	55.2	31	52.5	678	

Table 1: Contd.,							
Age of father at childbirth	20–39	367	31.3	17	28.8	384	>0.05
	40–59	405	34.5	20	33.9	425	
	60 and above	401	34.2	22	37.3	423	
Education of father	Illiterate	372	31.7	17	28.8	389	>0.05
	Literate	801	68.3	42	71.2	843	
Family history of epilepsy	Present	404	34.4	37	62.7	441	<0.05*
	Absent	769	65.6	22	37.3	791	
Consanguinity	Yes	438	37.3	34	57.6	472	<0.05*
	No	735	62.7	25	42.4	760	
History of febrile seizures	Yes	527	44.9	28	47.5	555	>0.05
	No	646	55.1	31	52.5	677	

* P value < 0.05 is significant

Table 2: Multiple Logistic Regression Analysis of Factors Associated with Recurrence of Febrile Seizures in Study Subjects

Factor	OR	95%CI Lower Limit	95%CI Upper Limit	P Value
Gender (Ref=Male)	0.36	0.17	0.78	0.008*
Age (Ref=6-10years)	0.41	0.19	0.96	0.039*
Age of mother at childbirth(1=20-39yrs,2=40-59yrs,3=60 and above yrs)	1.36	0.17	2.78	0.658
Family history of epilepsy (Ref=Absent)	3.74	2.29	6.12	<0.001*
Consanguinity (Ref=Absent)	1.31	1.15	6.21	0.003*

* P value < 0.05 is significant

Reference category for dependent variable is subjects without epilepsy